DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the image forming device which can avoid the image formation stop by a paper end.
[0002]
[Description of the Prior Art]In a copy machine, the number of sheets of a transfer paper required for image formation is fundamentally computable by the multiplication of manuscript number of sheets and the number of copies. In not setting the relation between manuscript number of sheets and a transfer paper to 1 to 1, for example, making a double-sided copy from an one side manuscript, the number of sheets of a transfer paper required for transfer is set to one half. That is, the number of sheets of an actually required transfer paper is computable with the manuscript number of pages, the number of copies, and the combination of a copy function.
[0003]However, in a conventional analog-type image forming device, since the picture of all the manuscripts cannot be held, based on the automatic count of manuscript number of sheets, transfer paper number of sheets is automatically uncomputable. If only a manuscript is ****(ed) for the count of manuscript number of sheets, a manuscript must be reset again and operativity and productivity will worsen. So, when transfer paper number of sheets was required, it was common to have counted manuscript number of sheets beforehand for user itself, and to have computed the number of sheets of a required transfer paper based on this counted result. Performing comparison of a number of copied sheets and a residue using a circle method manuscript feeder was also performed in part as indicated by JP,6-175430,A, but productivity was bad to the appearance with the above-mentioned thing at the point of

****(ing) only a manuscript for a count.

[0004]

[Problem(s) to be Solved by the Invention]On the other hand, in a digital image forming device, since all the read pictures are memorizable, transfer paper number of sheets required at the time of the end of manuscript reading can be computed, and comparison with the present transfer paper residue can be performed. So, as a result of comparing, when it is judged that a residue is enough, without reading a manuscript picture again, operation can be continued automatically and image formation can be performed.

[0005]However, since image formation operation is always performed after the end of reading of all the manuscripts, when clearly enough transfer papers remain, useless operation will be performed and it will become what has bad productivity.

[0006]In the compound copy machine (digital composite machine) provided with a facsimile ("FAX" is called hereafter.) function, a printer function, etc., image formation operation by the data arrival of FAX or a printer is performed in parallel, for example during copy operation. that time -- the transfer paper of the same size, and the case where comparison with a number of copied sheets and a residue is performed as mentioned above although there were generally many transfer papers of A4 size -- a residue -- in spite of having judged that it was enough, transfer is consumed by said parallel operation -- on the way -- a possibility of coming out and becoming a paper end is high.

[0007]This invention was made in view of the actual condition of such conventional technology, and the 1st purpose is to provide the image forming device which can judge the excess and deficiency of transfer paper number of sheets exactly, and can secure a high throughput.

[0008]The 2nd purpose is to provide the image forming device which can respond to various functions without enabling selection of an automatic function and sacrificing productivity.

[0009]The 3rd purpose is to provide the image forming device which does not produce a paper end, even if parallel operation of various functions is performed.

[0010]

[Means for Solving the Problem]This invention is characterized by an image forming device concerning the 1st means comprising the following, in order to attain said 1st and 2nd purposes.

A reading means which reads a manuscript.

Read image data and a means to accumulate draft information.

A means to form image data on a transfer paper.

A means to detect an end of reading of a manuscript by said reading means, and a means to

count manuscript number of sheets, A means to detect a residue of a transfer paper, a means to input a number of image forming sheets, and a means to specify image formation mode, Manuscript number of sheets counted by said means to count, an inputted number of image forming sheets, and a means to compute required transfer paper number of sheets from specified image formation mode, A means to compare a residue of a transfer paper with required transfer number of sheets, and a means to direct whether start print operation by end of comparison operations by this means to compare.

[0011]In order to attain said 3rd purpose, the 2nd means, In the 1st means, it has two or more application functions and a means to arbitrate a printing demand from two or more applications, At the time of setting out in the mode which does not start print operation, an end of comparison with a residue of a transfer paper and required transfer paper number of sheets controls printing of other applications.

[0012]

[Embodiment of the Invention]Hereafter, an embodiment of the invention is described with reference to drawings.

[0013]1. The outline composition of the image forming device concerning a 1st embodiment is shown in the composition and drawing 1 of operation of an image forming device.

[0014]The manuscript sheaf which turned the image face of the manuscript up and was placed in drawing 1 by the manuscript stand 2 with which the automatic draft feeder (henceforth ADF) 1 was equipped, If the start key 34 on the final controlling element 30 (drawing 2) is pressed, the position on the contact glass 6 will be fed with the feeding roller 3 and the feed belt 4 from the bottom manuscript. The manuscript which reading ended after reading the image data of the manuscript on the contact glass 6 with the read unit 50 is discharged by the feed belt 4 and the discharge roller 5. When it is detected with the manuscript set detecting sensor 7 that the manuscript stand 2 has the following manuscript, it is fed on the contact glass 6 like the Maehara draft. The feeding roller 3, the feed belt 4, and the discharge roller 5 are driven by a motor.

[0015]Paper is respectively fed to the transfer paper loaded into the 1st tray 8, the 2nd tray 9, and the 3rd tray 10 by the 1st sheet feeding device 11, the 2nd sheet feeding device 12, and the 3rd sheet feeding device 13, and it is conveyed to the position which contacts the photo conductor 15 with the vertical carrying unit 14. The image data read with the read unit 50 is written in the photo conductor 15 by the laser from the writing unit 57, and a toner image is formed by passing the development unit 27. And while a transfer paper is conveyed with the transportation belt 16 at rotation of the photo conductor 15 and uniform velocity, the toner

image on the photo conductor 15 is transferred. Then, a picture is fixed with the fixing unit 17 and it is discharged by the finisher 100 of an aftertreatment apparatus with the delivery unit 18.

[0016]The finisher 100 of an aftertreatment apparatus can usually lead the transfer paper conveyed by the paper ejecting roller 19 of the main part in paper ejecting roller 102 direction and the direction of a staple treating part. That is, paper can usually be delivered to the delivery tray 104 side via the transportation roller 103 by changing the switching plate 101 upwards. The switching plate 101 can be conveyed on the staple stand 108 via the transportation roller 105,107 by changing downward. Whenever paper is delivered to one sheet, a paper end side is arranged by the jogger 109 of ********, and the transfer paper loaded into the staple stand 108 is filed by the stapler 106 with a part of completion of a copy. With prudence, the transfer paper group filed with the stapler 106 is stored by the staple completion delivery tray 110.

[0017]On the other hand, the usual delivery tray 104 is a delivery tray movable forward and backward. For every copy part in which sorting was carried out by every manuscript or the image memory, the delivery tray part 104 movable forward and backward moves forward and backward, and classifies the copy paper discharged in simple.

[0018]It is setting the branching claw 112 for a course change to the upper part, and once stocks in the double-sided feed unit 111 without leading the transfer paper fed [paper] to which and formed from each paper feed trays 8-10 to the delivery tray 104 side, when forming a picture to both sides of a transfer paper. The double-sided feed unit 111 can be desorbed and can detect the existence of the double-sided feed unit 111 with the double-sided unit connection detecting sensor 113. The double-sided jogger 114 who moves the double-sided jogger 114 to it beforehand according to the width of a transfer paper when a transfer paper is stocked in the double-sided feed unit 111 is movable to the depth direction of drawing 1, When it opens most, a position can be detected and movement magnitude can be controlled by the jogger home position sensor 115 on the basis of the position. When opening the double-sided jogger 114 and the jogger home position sensor 115 is not able to detect a jogger in fixed time, it is dealt with as the double-sided feed unit 111 being unusual.

[0019]In order to transfer the toner image again formed by the photo conductor 15, paper re feeding of the transfer paper stocked by the double-sided feed unit 111 is carried out from the double-sided feed unit 111, it sets the branching claw 112 for a course change to the bottom, and leads it to the delivery tray 104. Thus, when creating a picture in both sides of a transfer paper, the double-sided feed unit 111 is used.

[0020]The photo conductor 15, the transportation belt 16, the fixing unit 17, the delivery unit

18, and the development unit 27 are driven with the main motor capacity which is not illustrated, and the transfer drive of each sheet feeding devices 11-13 is respectively carried out by the feed clutch in the drive of main motor capacity. The transfer drive of the vertical carrying unit 14 is carried out by the middle clutch in the drive of main motor capacity.

[0021]2. Final controlling element drawing 2 is a top view showing the final controlling element (navigational panel) 30.

[0022]There are the liquid crystal touch panel 31, the ten key 32, the clearance/stop key 33, the printing key 34, mode Clear key 35, the initial-setting key 38, etc. in the final controlling element 30, The function key 37, number of copies, the message that shows the state of an image forming device, etc. are displayed on the liquid crystal touch panel 31.

[0023]Drawing 3 is a figure showing a display example of the liquid crystal touch panel 31 of the final controlling element 30.

[0024]The key which shows the selected function by an operator touching the key displayed on the liquid crystal touch panel 31 is reversed black. When the details of a function must be specified (for example, if it is variable power variable power value etc.), it is touching a key and the setting screen of a detailed function is displayed. it is alike in this way, and since dot displays are being used for a liquid crystal touch panel, it can perform the optimal display at that time graphically The message area where the upper left displays the message of "it can copy", "waiting", etc. in drawing 3, and its right, The number-of-copied-sheets indicator which displays the set number of sheets, the automatic concentration key which adjusts the image concentration under it automatically, the automatic paper selection key and copy which choose a transfer paper automatically -- a part -- every -- page order -- the sort key which specifies the processing to arrange. A part of stack key which specifies the processing which classifies a copy for every page, and thing by which sorting application was carried out every The staple key which specifies the processing to file, It is a print key which sets up printing of elimination/navigation key which sets up the actual size key which sets magnification to actual size, the variable power key which sets expansion/reducing magnification, the double-sided key which sets up double-side mode, binding margin mode, etc., a stamp, a date, a page, etc. As for the mode chosen, a shading indication of the key is given. Under the number-of-copied-sheets indicator, the transfer paper number-of-sheets check key is provided.

[0025]3. Explain operation of the image read means in this embodiment, and operation until it carries out latent image formation of the picture on a recording surface hereafter using drawing 1 of operation to the latent image formation of the picture read by the image read means.

[0026]A latent image is potential distribution produced by changing a picture into light information and irradiating with it on a photo conductor side. The read unit 50 comprises the contact glass 6 and the optical scanning system which lay a manuscript, and the optical scanning system comprises the exposure lamp 51, the 1st mirror 52, the lens 53, CCD series 54, etc. The exposure lamp 51 and the 1st mirror 52 are fixed on the 1st carriage that is not illustrated, and the 2nd mirror 55 and the 3rd mirror 56 are being fixed on the 2nd carriage that is not illustrated. When reading a manuscript image, the 1st carriage and the 2nd carriage are mechanically scanned with the relative velocity of 2 to 1 so that light path length may not change. This optical scanning system is driven with the scanner drive motor which is not illustrated. A manuscript picture is read by CCD series 54, is changed into an electrical signal and processed. Image magnification changes by moving the lens 53 and CCD series 54 to a longitudinal direction in drawing 1. That is, corresponding to the specified magnification, a position is set as the longitudinal direction of the lens 53 and CCD series 54.

[0027]The writing unit 57 comprises the laser output unit 58, the image formation lens 59, and the mirror 60, and the inside of the laser output unit 58 is equipped with the rotating polygon (polygon mirror) which carries out constant-speed rotation by the laser diode and motor which are laser light sources at high speed. The laser beam irradiated from the laser output unit 58 is deflected by the polygon mirror which carries out constant-speed rotation, passes along the image formation lens 59, and is turned up by the mirror 60, and condensing image formation is carried out on a photo conductor side. The exposure scanning of the deflected laser beam is carried out in the direction which the photo conductor 15 rotates, and the direction (scanning direction) which intersects perpendicularly, and it records the line unit of the picture signal outputted from the selector 64 of the image processing portion mentioned later. By repeating horizontal scanning with the predetermined cycle corresponding to the revolving speed and storage density of the photo conductor 15, a picture (electrostatic latent image) is formed on a photo conductor side.

[0028]As mentioned above, the laser beam outputted from the writing unit 57 is irradiated by the photo conductor 15 of a picture imaging system. The beam sensor which generates a horizontal-scanning synchronized signal in the position which can irradiate with the laser beam near the end of the photo conductor 15 although not illustrated is arranged. Generation of the control signal for outputting and inputting the picture signal which the image recording start timing of a scanning direction controls and mentions later based on this horizontal-scanning synchronized signal is performed.

[0029]4. Explain the composition of the image processing portion (an image read section and

an image writing part) in the composition book embodiment of an image processing portion with reference to drawing 8.

[0030]the light irradiated from the exposure lamp 51 irradiates with a manuscript surface -- the catoptric light from a manuscript surface -- CCD series 54 -- an image formation lens (not shown) -- image formation -- photoelectric conversion is received light and carried out and it changes into a digital signal by A/D converter 61. As for the picture signal changed into the digital signal, after the shading compensation 62 is made, MTF correction, gamma correction, etc. are made by the image processing portion 63. In the selector 64, the change which uses the destination of a picture signal as either the variable power parts 71 or the picture memory controller 65 is performed. According to a variable power rate, scaling of the picture signal which went via the variable power parts 71 is carried out, and it is sent to the writing unit 57. It has composition which can output and input a picture signal bidirectionally between the picture memory controller 65 and the selector 64. Although not clearly shown in particular in drawing 8, to an image processing portion (IPU). It has a function which chooses input and output of two or more data so that the image data (data outputted from data processing devices, such as a metaphor personal computer) supplied from the outside besides the image data inputted from the reading part 50 can also be processed.

[0031]It has CPU68 which performs setting out in picture memory controller 65 grade, and control of the reading part 50 and the writing part 57 and ROM69 which store the program and data, and RAM70. Furthermore, CPU68 can perform writing of the data of the image memory 66, and read-out via the memory controller 65.

[0032]According to the printing image outputted from the printing image data generator 74 when making it function as a printer, a print synthesis section (1) and (2) -- printing composition is performed by 72 and 73, and the compounded printing image is stored in the image memory 66, or printing is performed with the writing unit 57.

[0033]4.1 Picture signal

Here, the picture signal for 1 page in the selector 64 is explained using drawing 10.

[0034]/FGATE expresses the shelf-life of the vertical scanning direction of 1-page image data. /LSYNC is a horizontal-scanning synchronized signal in every line, is the predetermined clock after this signal rises, and becomes effective [a picture signal]. The signal which shows that the picture signal of a scanning direction is effective is /LGATE. These signals synchronize with pixel clock VCLK, and 1-pixel data is sent to one cycle of VCLK. The image processing portion (IPU) 49 has the developmental mechanics of separate /FGATE, /LSYNC, /LGATE, and VCLK to an image input and each output, and the combination of various picture input and output becomes realizable.

[0035]4.2 Explain the memory controller in drawing 8, and the details of an image memory with reference to a memory controller, an image memory, next drawing 9.

[0036]The memory controller 65 has the block of the input data selector 101, the 102 or primary image synthesis section compression / expanding part 103, and the 104 or secondary output data selector compression / expanding part 105. Setting out of the control data to each block is performed from CPU68. The address in Drawing 8 and data show image data, and the data connected to CPU68 and an address are not illustrated.

[0037]The image memory 66 consists of the primary secondary storage 106,107. The memory in which rapid access, such as DRAM, is possible is used for the primary storage 106 so that data read from the data writing to a memory or the memory at the time of a generating picture can be performed at high speed synchronizing with [abbreviated] the transfer rate of inputted image data. The size of the image data which processes divided the primary storage 106 into two or more area, and it has taken simultaneously the composition (interface part with a memory controller) which can be performed for input and output of image data. In order to enable execution of the input of image data, and an output to parallel respectively in the divided each area, it is connected to the interface with a memory controller by 2 sets of address data lines, the object for a lead, and the object for lights. While this inputs a picture into the area 1 (light), operation of outputting a picture from the area 2 (lead) is attained.

[0038]The secondary storage 107 is a mass memory which saves data, in order to perform composition of the inputted picture, and sorting. If the primary secondary storage uses the element in which rapid access is possible, the primary 2 next will be fair, data can be processed, and control will also become comparatively easy. However, since elements, such as DRAM, are expensive, to secondary storage, an access speed is not so quick, but it is cheap, a mass recording medium is used, and it has the composition of performing processing of an I/O data via primary storage.

[0039]By adopting the composition of the above image memories, it becomes possible to realize the image forming device which can process input and output of a lot of image data, preservation, processing, etc. with cheapness and comparatively easy composition.

[0040]Next, the outline of operation of the memory controller 65 is explained.

[0041]<1> image input (preservation to an image memory)

The input data selector 101 chooses the image data which performs the writing from the inside of two or more data to an image memory (primary storage 106). The image data with the selected input data selector 101 is supplied to the image synthesis section 102, and performs composition with the data already saved at the image memory.

[0042]The image data processed by the image synthesis section 102 compresses data by primary compression / expanding part 103, and writes the data after compression in the primary storage 106. After the data written in the primary storage 106 compresses further by secondary compression / expanding part 105 if needed, it is saved at the secondary storage 107.

[0043]<2> generating pictures (read-out from an image memory)

At the time of a generating picture, the image data memorized by the primary storage 106 is read. When the picture used as an output object is stored in the primary storage 106, The image data of the primary storage 106 is elongated by primary compression / expanding part 103, and the data after extension or data after performing picture composition with the data after extension and input data is chosen and outputted by the output data selector 104.

[0044]The image synthesis section 102 processes selection (the dual output to a generating picture, the write back to the primary storage 106, and both output destination changes is also possible) of the output destination change of the data of the primary storage 106, and the data after composition (it has a phase adjustment function of image data) with input data, and composition, etc.

[0045]When the picture used as an output object is not stored in the primary storage 106, after elongating the output object image data stored in the secondary storage 107 by secondary compression / expanding part 105 and writing the data after extension in the primary storage 106, above-mentioned generating picture operation is performed hereafter.

[0046]In the hard structure figure of drawing 4, a system. Although constituted from the image read section 401, the image writing part 402, the system controller 403, the memory unit 404, the user restriction apparatus 405, the body detecting sensor 406, the telediagnosis device (CSS) 407, the clock 408, and the final controlling element 409, The memory unit 404 is required only when realizing a memory function, and only considering realizing the usual copy function, it is not necessary. If it becomes at a certain specific time, the clock 408 is required, only when booting machinery or realizing a weekly timer function [shut / weekly timer function]. The body detecting sensor 406 is required, only when the user has approached in front of machinery at the time of preheating mode and it realizes the function to cancel preheating mode automatically, Since CSS407 is a function which notifies a service center automatically or monitors mechanical run state/condition of use from a remote place when the telediagnosis, i.e., a mechanical error, occurs, it should be equipped with it only when such a function is required.

[0047]DRAM block 404a in the memory unit 404 in drawing 4 is for memorizing the picture signal read in the image read section 401, and can transmit the image data saved in the

image writing part 402 according to the demand from the system controller 403. The compressed block 404b possesses compression functions, such as MH, MR, and an MMR system, can compress the once read picture, and can aim at improvement in the utilization ratio of a memory (DRAM). Rotation of a picture is realized by changing the address read from the image writing part 402, and its direction. 404c is a DMA block.

[0048]At "The example of hard structure - A" of drawing 4 (a), control of image read section 401, image writing part 402, memory unit 404, and CSS407 is performed only by CPU403a of the system controller 403.

[0049]On the other hand, in "The example of hard structure - B" of drawing 4 (b). CPU is given to the image read section 401, the image writing part 402, and the memory unit 404, respectively, and system hard structure can be set up freely to transmit the command from the system controller 403 to each controller with the controlling signal line. In the hard structure figure, although only the image reading part 401 is specified, this image reading part 401 is provided also with the function to read these external pictures, when FAX and a printer controller are connected.

[0050]5. Network system drawing 5 shows the example of a system of the network copy at the time of carrying out this invention. Although eight sets of digital copies are connected by network in the figure, naturally the number of a copy connected does not need to limit.

[0051]5.1 Use drawing 6 for network hard style Shigeji, and explain the example of hard structure for realizing this invention. As shown in the figure, although the hard structure of one set of a digital plain paper copier has taken the almost same composition as what was shown by "The example of hard structure - A" of drawing 4, The picture read in the memory unit 404 is transmitted on an external network, Or since the image data from a network is saved in the DRAM block part 404a in a memory unit, SCSI(Small ComputerSystem Interface) 410 and SCSI controller 411 are used as a network means. Various means, such as using TCP/IP communication of an OSI (Open System Interface) reference model for data communications, can be considered using Ethernet as a physical means in a network communication means with a natural thing. Transmission of control commands like the state notification of each machinery which exists on a network inside the plane, or the remote output command mentioned later, and a setting command is also performed not to mention transmission of image data as mentioned above by using composition as shown in the figure.

[0052]Next, the operation (the following, remote output) which transmits the picture read by "A digital plain paper copier - A" to the image writing part 402 of "A digital plain paper copier - B" is explained (refer to drawing 6 and drawing 7).

[0053]"copy which drawing 7 is a key map of software and is shown in drawing 7 -- an application -- " -- the application which performs the copy sequence for performing copying operation. "Input/output control" is data raya (device driver) which carries out logic / physical conversion, and a final controlling element controller, the raya (a LCD display -- the light, / and) which performs MMI (Man Machine Interface) [LED-] Are the raya which performs a keystroke scan etc. with a logical level, and a "peripheral machine controller" An automatic double-sided unit and a sorter, It is the raya which performs control of the peripheral machine with which PPC, such as ADF, is equipped with a logical level, and an "image forming device controller", a "picture reading equipment controller", and a "memory unit" are as aforementioned. The "daemon process" exists in image data read-out saved in the memory unit, and an "image forming device" as application which performs the duty which transmits image data, when a print request is requested from other machinery on a network. Before a "daemon process's" reading a picture from a memory unit with a natural thing and performing print operation, the image transfer from other machinery on a network must be ended.

[0054]Here, a final controlling element, a peripheral machine, an image forming device, a picture reading device, and a memory unit are treated as a resource (resources) which each PPC holds. When "The digital plain paper copier - A" of the figure performs copying operation using each own resource (at the time of a print start key depression), Each resource of a "peripheral machine" and a "memory unit" is required of "system control" part from a "system controller" an "image forming device", an "image reader", or if needed. "system control" part -- "copy -- an application -- " -- from -- arbitrating the royalty of a resource to a demand -- "copy -- an application -- " -- the mediation result (use propriety) is notified. the resource which a system holds in the case (state by which network connection is not carried out) where "A digital plain paper copier - A" is used by a stand-alone -- all the "copies -- an application -- " -- since it is in the state which can be occupied, copying operation is performed immediately.

[0055]The royalty of a resource is required from the "system controller" of the remote digital plain paper copier which performs print operation using the resource of another machinery (henceforth, remote digital plain paper copier) which exists on a network like this embodiment on the other hand.

[0056]The system controller of a remote digital plain paper copier arbitrates a resource according to a demand, and notifies the result to the application of the machinery of a requiring agency. Application performs image transfer to the memory unit of the machinery of the remote output point via an external interface (this example SCSI), after performing reading of a picture and completing the image storage into an own memory unit, when a

royalty is permitted. After image transfer is completed and transmitting the monograph affairs (a paper feed port, a delivery port, print number of sheets, etc.) for carrying out print execution to the "daemon process" of the machinery of the remote output point, a "printing start" command is transmitted. If the "daemon process" of the remote output point receives a "printing start" command, a printing start will be required from the "system controller" of the machinery which performs a self "remote output, and a remote output will be performed by a system controller.

[0057]"When the memory unit of "A digital plain paper copier - B" is used by digital-plain-paper-copier-A", the memory unit of "A digital plain paper copier - B" is "digital-plain-paper-copier-B." (or) When two or more digital plain papers copier as shown in [drawing 5] are connected on a network, use of the application of digital plain papers copier other than "A digital plain paper copier - I" is improper.

[0058]6. the data flow of the I/O information of the external communication device in a connection copy system -- here explains the data flow of the I/O information of the external communication device in a connection copy system with reference to drawing 11. Especially drawing 11 is an example of composition of the connection copy system which comprised two sets. In the 1st PPC (1) shown with the numerals 1101, The external communication device 1102 is connected with the system controller 1103 via the external communication device interface 1104, and the information inputted into the external communication device 1106 from the communication controlling device 1105 is given to the system controller 1103. The system controller 1103 sends out information to the external communication device 1102 via the external communication interface 1104.

[0059]Similarly, in the 2nd PPC(2) 1106, it is connected via the external communication interface 1109, and the system controller 1107 and the external communication said place 1108 exchange I/O information. It is connected to the communication controlling device 1105 through the serial interface 1110-1111, and the external communication device 1102-1108 is further connected to the service center 1113 via the public line 1112.

[0060]The 1st and 2nd PPC(1) (2) 1101-1106 are connected with the connection interface 1114. The 1st system controller 1103 of PPC(1) 1101, Sending out can be directed to acquiring the input of the 2nd external communication device 1108 of PPC(2) 1106 via this interface 1114, and the 2nd external communication device 1108 of PPC(2) 1106. The 2nd system controller 1107 of PPC(2) 1106 acquires the input of the 1st external communication device 1102 of PPC(1) 1101 via the connection interface 1114 similarly, And sending out of the information on the 1st external communication device 1103 of PPC(1) 1101 can be directed.

[0061]7. Below the checking operation of transfer paper number of sheets explains the checking operation of transfer paper number of sheets to drawing 12 with reference to a flow chart.

[0062]In drawing 12, a start of a copy will judge whether it is confirmed whether there is transfer paper number of sheets of enough needed for a copy first (Step 1201). In checking transfer paper number of sheets, it chooses a transfer paper number-of-sheets check by the transfer paper number-of-sheets check key 301 of drawing 3. In not checking, processing after Step 1212 is performed, all the data which read, accumulated and (Step 1212-1213) accumulated the required number-of-copies part manuscript conventionally like operation is copied by manuscript number of sheets, and it ends this processing (Step 1214-1215).

[0063]On the other hand, in performing a transfer paper number-of-sheets check, in advance of reading of a manuscript, it forbids the printing demand from other applications, such as FAX and a printer (Step 1202). And a manuscript picture is read and it accumulates in an image memory. This operation is performed until a manuscript is lost (Step 1204-1205). In that case, the number of sheets of the manuscript to which paper was fed is counted (Step 1203). An end of reading of all the manuscripts will compute required transfer paper number of sheets from manuscript number of sheets, print copies, and copy modes, such as both sides, division, and concentration (Step 1206).

[0064]For example, when performing a double-sided copy from an one side manuscript and print copies are specified for a manuscript as five copies by ten sheets, it is 10x5/2=25 (sheet).

Thus, it calculates and computes that the transfer paper of 25 sheets is required. In the case of odd number, advanced amendment is carried out, and a value without excess and deficiency is computed to it so that there may be nine manuscript number of sheets.

[0065]Thus, if transfer paper number of sheets is computed, the transfer paper residue currently detected by the residual quantity detecting sensor of the computed transfer paper number of sheets and an applicable paper feed tray will be measured (Step 1207), and it will be judged whether the transfer paper remains enough (Step 1208). If residues are insufficient, the warning of the purport that transfer papers are insufficient will be displayed, and operation will be suspended (Step 1209). On the other hand, when a residue is judged to be enough, all the data stored in the memory at Step 1210 is printed by required number of copies, and processing is finished. In that case, the printing demand from other applications forbidden at Step 1202 is permitted, and it prepares for the next copy operation etc.

[0066]Thus, when copying, the transfer paper has prevented being used for other

applications by forbidding the printing demand from other applications. Although not explained here, making it receive, without forbidding the printing demand to the transfer paper with which sizes differ from other applications on the occasion of the copy processing of drawing 12 can also be easily set up by software.

[0067]Since print operation will be performed after the number of sheets of a required transfer paper is guaranteed if it processes in this way, a transfer paper being exhausted in the middle of printing, and causing an operation stop is lost, and the image forming device which was excellent in operativity by this can be provided. Since a transfer paper is not needed while having read the manuscript, the operation stop in the middle of printing is avoidable by supplying a transfer paper between them. For example, if it is made the business which reads a manuscript into this supplying time while using the feed unit which is a tandem feed stage and which requires time for replenishing operation, it is also possible to make stop time of an image forming device shorter. If an automatic function is set up selectable, sacrificing-high throughput in several few sheet copy etc. necessity will also be lost.

[0068]While being able to guarantee operation of an automatic function by stopping other application operation which affects an automatic function if needed, it becomes possible to control efficiently on the whole, and can be considered as the image forming device excellent in productivity.

[0069]8. terminological explanation and a definition -- here, while adding explanation about the term used in common by each embodiment, clarify the definition about these terms.

[0070]-[Image reader] [Image read section]

The "image reader" used by a digital plain paper copier irradiates a manuscript with a light source, and changes the catoptric light into an electrical signal by "solid imaging element =CCD", and the device with the function to perform "required image processing" is used.

[0071]Processing which changes into a binary or multi value data here the analog data changed into the electrical signal by quantization:CCD with "required image processing."

[0072]Shading compensation: Processing which amends the radiation unevenness of the light source which irradiates with a manuscript, and sensitivity dispersion of CCD.

[0073]MTF correction: Processing which amends the Japanese quince by an optical system.

[0074]Variable power processing: Processing which carries out a data interpolation using the image data which changed the reading density of the picture and read it.

[0075]Processing of ** is shown.

[0076]-[Image forming device] [Image writing part]

The "image forming device" or the "image writing part" used by a digital plain paper copier is

a device which forms in a regular paper, a thermal paper, etc. the picture images sent with the electrical signal by electro photography, heat sensitivity, hot printing, an ink jet, or other means.

[0077]-[Video signal] [Image data]

The signal for taking the electrical signal of the picture changed with the above-mentioned "image reader", the electrical signal of a picture inputted into an "image forming device" and the electrical signal of a picture, and a synchronization is collectively expressed as a "video signal" or "image data."

[0078]-[Control signal] [Command]

In order to exchange a "video signal" between an "image reader", an "image forming device", and "application", it is necessary to transmit information mutually between devices. This means is expressed as a "control signal" or "command" issue.

[0079]-[Expanded function]

-[Application (it abbreviates to an application)]

-[Memory function] [Memory unit]

A picture is changed into an electrical signal, and is read into the big feature of a digital plain paper copier, and an image forming device restores an electrical signal. It becomes applicable to fields other than the conventional analog PPC by having a means to change and to transmit variously the electrical signal read at this time. Functions, such as FAX, a page printer, a scanner, and a file system, are realizable, and also these days, By once storing the read image data in memory storage, such as DRAM, at the time of execution of a PPC function, and reading image data if needed, The function (= following memory function) etc. which perform two or more prints with one scan at the time of two or more copies, or print two or more manuscripts on the transfer paper of one sheet are realized. A function realizable by these digital-plain-paper-copier systems is expressed as "expanded function" or an "application."

[0080]In this invention, the memory unit is used also as a buffering means at the time of the image data transfer between the machinery on a network.

[0081]-[System controller] [System]

When performing copying mode, in order to carry out image formation in an image writing part, In order to read a picture by surveillance inside the plane, such as paper logistics, electro photography process treatment, an abnormal condition, and sheet paper cassette states (existence of paper, etc.), and an image read section, the controller which controls scanner operation, ON/OFF of a light source, etc. is named generically, and it is expressed as a "system controller."

[0082]It not only carries one expanded function, but in the latest digital plain paper copier, it has come to carry out simultaneous loading of two or more applications. Thus, the digital plain paper copier which shares one resources may be expressed as a "system", and the controller which controls this system may be expressed as a "system controller."

[0083]-[Resources] [Resource]

The functional unit unit shared from two or more applications is expressed as "resources" and a "resource." The above-mentioned "system controller" is performing system control in this resource unit. The resources managed by the digital plain paper copier of this embodiment have an "image reader", an "image forming device", a "final controlling element", a "memory", "peripheral machines, such as = ADF, a sorter, and an automatic double-sided unit,", etc.

[0084]-[User restrictions] Since PPC which is using especially the electrophotography process has many amounts of consumption, there is a case where he does not want to permit use indefinitely. In order to specify, limit and manage a "user" at this time, "user restriction apparatus", "password cords", etc., such as a "coin rack", a "key counter", a "keycard", and a "prepaid card", are used.

[0085]-[User set] When a system becomes complicated, the individual correspondence for every user is needed. Since it is impossible to satisfy all of these correspondences at the time of factory shipments, correspondence in a commercial scene becomes indispensable. Therefore, although unvolatilized RAM is equipped and system construction according to a visitor's demand is usually made possible, this function is expressed as an "user set."

[0086]-[Idle state] The state where operation by a user is not performed expresses the state where fixed time continuation was carried out as an "idle state", and expresses the other state as a "busy state." An user set is possible for time until it changes from a "busy state" to an "idle state." For example, even if copying operation is completed, unless the non-operating condition by fixed time and a user continues that it is under [copying operation] of course, it does not change to an "idle state."

[0087]-[Weekly timer] The function which turns on and off a power supply in accordance with the ON/OFF time set up for every day of the week. The operation for carrying out matching the time of the clock module for this function and operation of setting up ON/OFF time for every day of the week are required.

[0088]-[Preheating] It is the mode in which power consumption is saved, by constant-temperature(for example, 10 **)-lowering fixing temperature, controlling it, and erasing a final controlling element display. Setting out in this mode is automatically set up after fixed time, after operation and operation are lost depending on the keystroke by a final controlling

element, and machinery setting out. This mode release is canceled when the keystroke by a final controlling element and machinery setting out detect that people stood in front of machinery with the body detecting sensor.

[0089]-[Reloading] Fixing temperature says Mr. attainment and the state which can be copied as reloading to the temperature which can be established. -[Interruption mode] It is the mode when interrupting below it and copying copy work temporarily during copy operation execution and operation. If it is by setting up this mode in the middle of the copy mode before that, and a copy, that progress information will be memorized to unvolatilized RAM, it will shift to interruption mode, and the mode will be initialized. After copy operation execution, if interruption mode release is carried out, the mode and the information which were memorized to unvolatilized RAM can be returned, the state before interruption mode setting out can be returned, it can interrupt by a new start, and the front mode can be continued. The key of a final controlling element can perform setting out/release in this mode.

[0090]-[CSS] (Or) [Telediagnosis system] **[Image forming device managerial system]) Drawing 13 shows the composition of the image forming device managerial system. The controlling device 1301 currently installed in the service base and the apparatus 1302-1306, such as PPC currently installed in a user's origin, are connected via the public network 1307. The communication controlling device 1308-1309 for controlling communication with a controlling device is installed in the user side, and PPC 1302-1306 of user origin is connected to this communication controlling device 1308-1309. Connection of the telephone 1310 or the facsimile 1311 is attained at the communication controlling device 1308-1309, and installation is possible in the form inserted in a user's existing circuit. Although two or more PPC is connectable, of course, there may be the singular number in the communication controlling device 1308-1309. A model which does not need to be of the same type and is different may also be available for such PPC, and apparatus other than PPC may be sufficient as it.

[0091]Here, after [expedient] explaining, one communication controlling device is used [that a maximum of five sets of PPC are connectable and]. Multidrop connection of a communication controlling device and two or more PPC is carried out by RS-485 standard. Communications control between a communication controlling device and each PPC is performed by the basic mode data transmission control procedure. Communication with arbitrary PPC is attained by establishing a data link with the polling selecting mode of the centralized control which made the communication controlling device the control station. Each PPC can set up a peculiar value now with an address setting switch, and the polling

address of each PPC and a selecting address are determined by this.

[0092]

[Effect of the Invention]The manuscript number of sheets counted by old explanation so that clearly, the inputted number of image forming sheets, and a means to compute required transfer paper number of sheets from the inputted image formation mode, According to the invention [provided with a means to compare the residue of a transfer paper with required transfer number of sheets, and a means to direct whether start print operation by the end of comparison operations by this means to compare] according to claim 1. Since print operation is performed after the number of sheets of a required transfer paper is guaranteed, a transfer paper being exhausted in the middle of printing, and causing an operation stop is lost, and a high throughput can be secured. Selection of an automatic function is enabled, and it can respond to various functions, without sacrificing productivity. Even if parallel operation of various functions is performed, the image forming device which does not produce a paper end can be provided.

[0093]It has two or more application functions and a means to arbitrate the printing demand from two or more applications, At the time of setting out in the mode which does not start print operation, the end of comparison with the residue of a transfer paper and required transfer paper number of sheets. According to the invention according to claim 2 which controls printing of other applications, since other application operation which affects an automatic function is deterred appropriately, while being able to guarantee operation of an automatic function, it can be considered as the image forming device excellent in productivity.

[Translation done.]